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Docket No. KIM-10113

Amendments to the Claims are reflected in the listing of claims which begins on page 3 of this paper.

Remarks/Arguments begin on page 9 of this paper.

AMENDMENTS TO THE CLAIMS

Please amend claims 2-9 as indicated among the following complete set of pending claims:

1.   (Canceled)

2.   (Currently Amended) A method ~~for processing audio data~~ executed in a computing system for preprocessing audio data before subsequent processing by a predetermined codec optimized for voice data, the predetermined codec being operable to encode the audio data using one of a plurality of encoding rates, the predetermined codec being configured to classify at least some frames of audio data as noise data thereby encoding the at least some frames at the lowest encoding rate among the plurality of encoding rates, and to classify at least some other frames of audio data as valid voice data thereby encoding the at least some other frames at one of the plurality of encoding rates other than the lowest encoding rate thereof, the preprocessing method comprising the steps of:

~~classifying the audio data based on a characteristic of the audio data;~~

~~in case the audio data includes monophonic sound, performing automatic gain control (AGC) preprocessing of all frames of the audio data, wherein the AGC preprocessing enhances energy of all the frames;~~

~~in case the audio data includes polyphonic sound, performing AGC preprocessing of selected frames of the audio data, wherein the AGC preprocessing enhances energy of the selected frames;~~

~~determining a selected encoding rate from a plurality of encoding rates based on a~~

~~characteristic of the AGC preprocessed audio data; and~~

~~encoding the AGC preprocessed audio data at the selected encoding rate with a codec~~
~~having the plurality of encoding rates~~

analyzing, in the computing system, audio data so as to select the at least some

frames that, when provided to the predetermined codec, are classified as noise data and

encoded at the lowest encoding rate by the predetermined codec; and

adjusting, in the computing system, energy of the at least some frames of audio data

selected in the analyzing so as to produce preprocessed frames of audio data that, when

provided to the predetermined codec, are classified as valid voice data and encoded at the

one of the plurality of encoding rates other than the lowest encoding rate thereof,

wherein preprocessing the audio data causes the predetermined codec to classify the

preprocessed frames of audio data as valid voice data instead of noise data.

3.   (Currently Amended) The method in accordance with claim 2, ~~wherein the step of~~

~~performing AGC preprocessing of selected frames includes deciding whether a frame in the~~

~~audio data includes noise signal or not~~ further comprising the step of determining whether a

frame in the audio data is a silence frame based on the energy of the frame, wherein when

the frame is a silence frame, the energy thereof is not adjusted in the adjusting step.

4.   (Currently Amended) ~~A method for processing audio data, comprising the steps of:~~

~~deciding an interval of audio data that is to be encoded in a low bit rate in said a~~

~~codec having a plurality of encoding rates;~~

~~adjusting the amplitude of audio data of the decided interval;~~

~~determining a selected encoding rate from the plurality of encoding rates based on a~~

~~characteristic of the amplitude-adjusted audio data; and~~

~~encoding the amplitude-adjusted audio data at the selected encoding rate with the~~

~~codec~~ The method in accordance with claim 2, wherein the adjusting comprises the steps of:

calculating signal levels of the selected frames of the audio data;

determining gain values based on the calculated signal levels produced by the

calculating; and

generating preprocessed frames of audio data by multiplying the gain values to the

selected frames of audio data.

5.   (Currently Amended) The method in accordance with claim 4, wherein ~~the adjusting~~

~~step comprises the steps of:~~

~~calculating signal levels of the audio data;~~

~~deciding smoothed gain coefficients based on signal levels; and~~

~~generating preprocessed audio data by multiplying the smoothed gain coefficients to~~

~~the audio data in the decided interval~~ the frame includes a set of samples including a current

sample, and a signal level for the current sample is determined based on the current sample

and other samples adjacent to the current sample, and the gain value for the current sample

in the frame is determined based on the signal level of the current sample.

6.   (Currently Amended) ~~An apparatus for processing audio data, comprising:~~

~~means for encoding a signal at a plurality of encoding rates;~~

~~means for deciding an interval of audio data that is to be encoded in a low-bit-rate by~~
~~said means for encoding; and~~

~~means for adjusting the amplitude of audio data of the decided interval,~~

~~wherein said means for encoding receives the amplitude-adjusted audio data as the~~
~~signal, determines a selected encoding rate from the plurality of the encoding rates based on~~
~~a characteristic of the amplitude-adjusted audio data and encodes the amplitude-adjusted~~
~~audio data with the selected encoding rate~~ The method in accordance with claim 5, wherein
the signal level for the current sample is determined based on the current sample and a first
set of samples within an attack time ahead of the current sample, and a second set of samples
within a release time behind the current sample.

7.   (Currently Amended) ~~A method for processing audio data, comprising the steps of:~~

~~deciding whether a frame in the audio data would be determined as noise signal when~~
~~the audio data is encoded by a codec having a plurality of encoding rates; and~~

~~if it is decided that the frame would be determined as noise signal, adjusting an~~
~~amplitude of the frame;~~

~~determining a selected encoding rate from the plurality of encoding rates based on a~~
~~characteristic of the amplitude-adjusted frame; and~~

~~encoding the amplitude-adjusted frame at the selected encoding rate with the codec~~
The method in accordance with claim 6, wherein the attack time and the release time can be
changed based on the characteristic of the audio data.

8.   (Currently Amended) ~~A method for processing audio data, comprising the steps of:~~

~~deciding whether the audio data would be encoded in a low bit rate at a codec having a plurality of encoding rates;~~

~~if it is decided that the audio data would be encoded in the low bit rate at the codec, adjusting an amplitude of audio data;~~

~~transmitting the amplitude-adjusted audio data to the codec through transmission channel;~~

~~determining a selected encoding rate from the plurality of encoding rates based on a characteristic of the amplitude-adjusted audio data; and~~

~~encoding the amplitude-adjusted audio data at the selected encoding rate with the codec~~ The method in accordance with claim 2, wherein the predetermined codec is configured to classify frames of the audio data into the noise data or the valid voice data using a predetermined rate decision algorithm, and the analyzing includes classifying frames of audio data into at least one of the noise data and the valid voice data using the predetermined rate decision algorithm.

9.   (Currently Amended) ~~An apparatus for processing audio data, the apparatus~~
~~comprising:~~

~~means for encoding a signal at a plurality of encoding rates;~~

~~means for classifying the audio data based on the characteristic of the audio data;~~

~~means for deciding an interval of the audio data that is to be encoded in a low-bit-rate~~
~~in said means for encoding in case the audio data is determined to include polyphonic sound~~
~~based on the classification; and~~

~~means for performing automatic gain control (AGC) preprocessing of all frames of~~
~~the audio data in case the audio data is determined to include monophonic sound based on~~
~~the classification, and performing AGC preprocessing of frames of the decided interval in~~
~~case the audio data is determined to include polyphonic sound based on the classification,~~

~~wherein said means for encoding receives the amplitude adjusted audio data as the~~
~~signal, determines a selected encoding rate from the plurality of encoding rates based on a~~
~~characteristic of the amplitude adjusted audio data and encodes the amplitude adjusted audio~~
~~data with the selected encoding rate~~ The method in accordance with claim 2, wherein the
computing system for preprocessing audio data is a separate system from the predetermined
codec.

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